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# JOHN F. KENNEDY SPACE CENTER

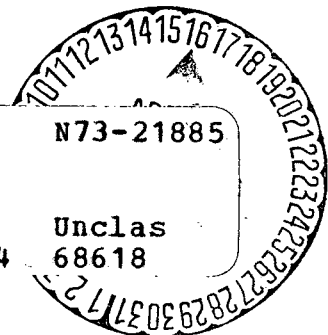
IMPLEMENTING INSTRUCTIONS FOR KSC SYSTEMS  
AND SAFETY TRAINING

(NASA-TM-X-69219) IMPLEMENTING  
INSTRUCTIONS FOR KSC SYSTEMS AND SAFETY  
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## PREFACE

This Handbook implements the provisions of KMI 3410.2B/AD as it relates to systems and safety training. It provides a coordinated training program for the government-industrial complex which makes up KSC. The benefits to be derived from such a program include elimination of duplication of effort, maximum use of existing capability and knowledge, reduced lead time in providing essential training, and the resulting cost savings.

This Handbook outlines the requirements for the program, defines responsibilities and outlines the mechanics for implementing that program. The provisions of this Handbook should be contractually invoked on each contractor organization whose role at KSC is compatible with the objectives of the Systems Training Program.

This Handbook supersedes and replaces KHB 3410.1/AD, The KSC Systems Training Program Implementing Instructions, dated August 27, 1970.



George A. Van Staden  
Director of Administration

Distribution:  
STD-L-P, K

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LIST OF REFERENCES

Number

KMI 1710.5/SF	Safety Training
KMI 1820.2/IS	Medical First Aid Training
KHB 3410.2/AD	Implementing Instructions for Employee Development and Training
KMI 3410.2B/AD	Employee Development and Training
KMI 5310.6/QA	Quality Assurance and Reliability Personnel Training and Certification
NHB 7500.1	Apollo Logistics Requirements Plan
K-V-053	Apollo/Saturn (IB, V) Skylab Ground Safety Plan

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## 1. PURPOSE

This Handbook implements the requirements of KMI 3410.2B, Employee Development and Training, for the establishment of a coordinated systems and safety training program for the government-industrial complex that makes up KSC.

## 2. APPLICABILITY

This Handbook applies to all KSC elements having primary operational or program responsibility for the KSC mission and to KSC-associated contractors as provided under the terms of their respective contracts. It includes that training peculiar to and necessary for transportation, inspection, checkout operations, and maintenance of launch vehicles, spacecraft, ground support equipment and facility systems and for launch teams. Systems related reliability and quality assurance training, safety training, and first aid training required by KMI 5310.6, KMI 1710.5, KMI 1820.2, or contractual provisions will also be provided under the provisions of this Handbook.

## 3. RESPONSIBILITIES

- a. The Directors of Launch Operations, Technical Support, Installation Support and Design Engineering will be responsible for:
  - (1) Developing contract work statements, specifying the contractor's requirement for training and invoking the provisions of this Handbook where appropriate.
  - (2) Determining the training required to operate, test, checkout, and maintain launch vehicle and spacecraft systems, ground support equipment and facilities.

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- (3) Establishing levels of training required for various functions and determining certification required.
  - (4) Monitoring and evaluating the contractor's training effort to assure technical adequacy and level of performance.
  - (5) Determining what additional training is required and can be accomplished by on-the-job training and/or classroom training.
  - (6) Determining facility and equipment requirements necessary to support the training effort.
  - (7) Initiating, in conjunction with the appropriate program office, the Procurement Office, and the Systems Training and Employee Development Branch, scope changes or other contractual action that may be required to accomplish training.
  - (8) Coordinating use of operating equipment/facilities for training purposes.
  - (9) Maintaining necessary records for management control of training programs.
  - (10) Designating a training coordinator(s) to represent the organization with respect to training requirements and to coordinate/administer internal training activities.
- b. KSC Program Managers will be responsible for assuring that contract work statements for training are incorporated into contracts where needed and for reviewing and assessing adequacy of training plans relating to their respective programs.

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- c. KSC contractors will, to the extent covered by their contracts, be responsible for:
  - (1) Providing training necessary to support their functions. (Exceptions to this general requirement are made in instances where the training requirement is common to other organizations and, in such cases, KSC will determine the training source.)
  - (2) Providing cross-training for NASA and other contractor personnel where a defined requirement exists.
  - (3) Preparing and providing a detailed training plan to the cognizant KSC directorate for approval.
  - (4) Collaborating with the cognizant KSC operating organization and the Systems Training and Employee Development Branch in the establishment of schedules.
  - (5) Identifying and collaborating with the Systems Training and Employee Development Branch in enrolling its personnel in required training conducted by other organizations.
  - (6) Maintaining records necessary to reflect status of the training program.
- d. The Chief, Systems Training and Employee Development Branch, will be responsible for:
  - (1) Administering the KSC Systems Training Program, including review of contractor training plans, and implementation of those plans in order to eliminate duplication and assure maximum economical use



of KSC assets and those of NASA contractors.

- (2) Collaborating with KSC and contractor organizations in determining requirements for training and developing training courses to meet needs.
- (3) Collaborating with KSC directorates and contractor organizations in the development and publication of training schedules.
- (4) Controlling allocation of quotas for training courses having application across organizational lines.
- (5) Assisting in the development of requirements for training aids and equipment compatible with courses at KSC.
- (6) Coordinating use and assignment of KSC classrooms.
- (7) Maintaining training records.
- (8) Reporting status of the training program.
- (9) Maintaining and distributing course descriptions to using organizations.

#### 4. PROGRAM DOCUMENTATION FLOW

- a. Documentation, except for class rosters, required from contractor organizations by this Handbook will be forwarded to the \*Contract Technical Manager with a concurrent information copy to the KSC Systems Training and Employee Development Branch. Communications relating to the administration of their approved training plan and class rosters may be directed to the Systems Training and Employee Development

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Branch. Except for class rosters, concurrent information copies should be forwarded to the \*Contract Technical Manager.

- b. Direction to the contractor organizations and approval of their training plans will be provided by the \*Contract Technical Manager. Coordination and administration of the plans will be provided by the Systems Training and Employee Development Branch.
- c. Where conflict develops between the requirements of two or more contractor organizations, the conflict will be resolved by the Systems Training and Employee Development Branch in coordination with the \*Contract Technical Managers concerned.

\*Functions defined for the Contract Technical Manager may be performed by the Contract Management Assistance Officer where organizational practice dictates.

##### 5. DEVELOPMENT OF TRAINING PLANS

- a. KSC organizations will develop a systems training plan under the provisions of KHB 3410.2 . Requirements will be documented as a part of the response to annual and periodic surveys conducted by the Systems Training and Employee Development Branch. Course requirements will be reflected on KSC Form 13-95.
- b. Contractor organizations will develop training plans covering all aspects of the systems training requirements imposed by the organization's mission. This plan should cover, as a minimum, training requirements, courses planned to meet the requirements, training aids needed to support the training,

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a time-phased projection of the number of personnel requiring each course, organization required to administer and conduct the training, and an evaluation plan. In developing the training plan, consideration should be given to the total anticipated need at KSC and to prior training that the personnel have received.

- c. The analysis techniques defined in NHB 7500.1 will be followed in the development of courses on new equipment. An analysis, including an evaluation of operational experience, will be made in the development of new courses on existing equipment and in review of existing courses. The training plan should document proposed means of satisfying training requirements that are identified from analysis of training requirements. They should be supplemented when changes in requirements or course offerings occur. The plans will include the following parts:
- (1) Introduction: This section defines the program area covered by the training plan. It will include the scope, purpose, and implementation plans.
  - (2) Training Courses: Training courses will be identified by course number, title, duration, and class capacity. A description of each course, in the format shown in Exhibit 1, will be submitted as a part of the training plan. Course descriptions should be changed as changes occur in course content or length, or as courses are deleted from the inventory. These changes can be made by a letter supplementing the training plan.
  - (3) Training Requirements: Quantitative training requirements by fiscal quarter, fiscal year, and total program will be reflected on KSC Form 13-95 (see Exhibit 2) or

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a similar form. Where the contract year does not correspond to the Federal Government fiscal year, the contract fiscal year and fiscal quarter may be used; however, inclusive dates must be shown. Requirements in areas not within the scope of the contractor's responsibility at KSC, but essential for providing the necessary interfaces, will be reflected in the same format. Where requirements are shown for courses provided by sources outside the contractor's organization, a separate sheet should be used for each source (NASA or other contractor organization). Major operational milestones reflecting operational readiness dates should be identified in remarks.

- (4) Training Evaluation: A training evaluation plan will provide for evaluation of the effectiveness of the contractor's total training program, as well as the effectiveness of each training course in meeting course objectives. If the plan does not specify an evaluation procedure, the criteria outlined in paragraph 12 will apply.
- (5) Resource Requirements: These requirements, with supporting justification, will include facilities, equipment, materials, staffing, and any special support required from outside the organization. (Manpower, facilities and equipment are furnished by the contractor from the resources provided for in the contract. Approval of the training plan does not constitute approval of additional resources.)

## 6. TRAINING COURSE NUMBERING SYSTEM

Training courses will be classified in the following categories:

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familiarization, operation, maintenance and skills certification. Each course will consist of a two-letter prefix, a three-digit number, and either a two- or three-letter suffix as outlined below. If other numeric identification is required by the contractor, it should be included in the course title.

- a. Prefix Identification: The two-letter prefix will be designated as follows:

<u>First Letter</u>	<u>Second Letter</u>
E - Electrical	C - Spacecraft
M - Mechanical	S - Stage
I - Instrumentation	P - Support (courses not included in C, S, and Y)
O - Operations	Y - Systems (other than C and S)
L - Logistics	
Q - Quality and Reliability	
G - Ground Support Equipment	
X Multiple	

- b. Number Identification. The three-digit number will be assigned as follows:

- (1) Familiarization Courses (100 and 200 Series): These courses provide general information on a system or operation. They are designed for management and supervisory personnel, and engineers and technicians who need an understanding of a system or operation but will not be required to function as an operator or to perform maintenance.
- (2) Operational Training Courses (300 Series): These courses provide the necessary background, operational procedure and toolhandling information for functional

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operation of equipment or procedures. These courses are designed primarily for systems engineers and technicians who are directly responsible for the operation of a system, subsystem, or item of hardware.

- (3) Maintenance Training Courses (400 Series): These courses provide an individual with intimate knowledge of a specific system or subsystem. They probe deeply enough into a subject to enable an individual to perform fault isolation tasks and repair at the component level. They cover such components as valves, cover plates, disconnects, et cetera. These courses cover areas of criticality which generally involve the operational readiness of a vehicle and the turn-around-time in repair of a system or subsystem in a vehicle or ground support equipment.
  - (4) Skills Certification Training Courses (500 Series): These are skills courses which provide training that leads to a specific skill level. These courses culminate in formal certification that the individual has reached the prescribed skill level as cited in a NASA/KSC specification, contract specification, or other appropriate document; for example, Reliable Electrical Connections (hand soldering) under NHB 5300.4 (3A).
- c. Suffix Identification. The suffix letters in a course number are used to identify the organization presenting the course. Where the accepted abbreviation of the company name will fit into the format, it would normally be used. However, the suffix cannot be more than three or less than two letters in length.
  - d. Numbering System Examples. The following examples illustrate the composition of course numbers.

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- (1) XY-201 CHR - A familiarization course on multiple systems, having both ground support and stage application, presented by the Chrysler Corporation.
- (2) OP-301 IBM - A course on an operational method for a support activity conducted for people who must operate the system, presented by the International Business Machines Corporation (IBM).
- (3) GC-404 GE - A course on ground support equipment for the spacecraft conducted for persons who must troubleshoot and maintain the hardware, presented by the General Electric Corporation.

7. COURSE DEVELOPMENT

Courses will be established by each contractor organization to meet the training requirements identified for its systems and equipment and for facilities primarily under its control. Course parameters will be based on a detailed analysis of functions and tasks to be performed or information to be conveyed. The identity of Contract End Item and Program Element Numbers, when applicable, being covered in a training course should be reflected in the course description. Courses will be revised as changes become apparent in the equipment or documentation. Detailed lesson plans will be developed and maintained in a current status for each course in a contractor's active inventory.

8. COURSE CATALOG PREPARATION

Course descriptions developed in accordance with the provisions of paragraph 5c(2) will be incorporated into the KSC Systems Training Course Catalog. This catalog will be issued and maintained by the Systems Training and Employee Development Branch. It will be revised on a continuing basis to reflect changes in course availability

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and course content or length reflected in supplements to the contractor's training plan. Distribution of the catalog will be made to the training coordinators of each participating contractor organization and to interested NASA organizations.

9. ESTABLISHING TRAINING SCHEDULES

The Systems Training and Employee Development Branch will advise contractor organizations of the requirements that other organizations have for their courses. These, along with their own requirements, will form the basis for projecting a specific class schedule. In addition to the total requirements, the following factors must be considered in establishing training course schedules:

- a. Facility and equipment installation and acceptance checkout dates
- b. Vehicle systems checkout and launch date
- c. Workload cycles
- d. Availability of GSE
- e. Availability of instructors and students
- f. Mandatory completion dates for training

Specific schedules will be projected to cover a one-month period and will be delivered to the Systems Training and Employee Development Branch, on KSC Form 13-79 (see Exhibit 3) or a similar form, not later than the seventh day of the preceding month. Spaces required by the organization conducting the training will be shown on the schedule. The Systems Training and Employee Development Branch will distribute the schedules and allocate spaces to other organizations whose approved plans include requirements for the



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course(s). Specific scheduling of contractor employees will be accomplished between the training coordinators of the organizations involved. KSC employees will be scheduled through the Systems Training and Employee Development Branch. Questions of priority or other conflict situations will be referred to the Systems Training and Employee Development Branch for resolution. These problems will be resolved in coordination with the contract technical managers responsible for the functions involved.

10. COURSE ENROLLMENT

- a. Organizations (KSC and associated contractors) requiring training will ensure that their training plan is current in its projection of their needs. The KSC Systems Training and Employee Development Branch will in turn inform the training organization of the requirements. Spaces will be allocated by the Systems Training and Employee Development Branch on a consolidated monthly schedule. Contractor training organizations are encouraged to discuss work schedules and priorities with each other in order that courses can be scheduled at the most advantageous time. Courses which are below minimum enrollment will be reviewed and evaluated for possible cancellation.
- b. Participating organizations will ensure that trainees report punctually to the training facility. If for any reason an enrollee is unable to attend class, his supervisor should immediately enroll another person who has need for the training or cancel the enrollment through the training coordinator. The Systems Training and Employee Development Branch may withdraw an allocated space and reallocate it to another organization when relative priority dictates such action.

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- c. On reporting to the training facility, the enrollee will be registered on an attendance roster, using KSC Form 13-81 (see Exhibit 4) or a similar form. The enrollee's name, organization, and Social Security Number will be entered legibly on the attendance roster. Attendance will be reflected for each class session. A legible copy of the attendance roster will be furnished to the KSC Systems Training and Employee Development Branch and to the training coordinators of participating contractor organizations as soon as possible but not more than 10 days after course completion.

#### 11. INSTRUCTOR STAFFING AND TRAINING

Training will normally be accomplished by using local instructor staffs supplemented by personnel from local operations. When similar or like training is provided by the contractor at locations other than KSC, instructor staffing at KSC will be supplemented by instructors from other locations only when it is more economical to do so or when it will result in more timely or more effective support of KSC operations. A major part of instructor training in operational functions at KSC can be accomplished during the installation, checkout, and operation of equipment or systems. Specialized instructor training courses at other locations will be used only when adequate training cannot be provided at KSC.

#### 12. TRAINING PROGRAM EVALUATION

- a. Each training organization will periodically (at least annually) evaluate its training program to determine the level of performance and the effectiveness of the training. This evaluation will be retained as a part of the contractor organization's training records. The following criteria should be considered in evaluating the training program:

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- (1) The training program must continually emphasize critical areas of operation to minimize potential danger to personnel.
  - (2) The program must be flexible enough to provide for changes in operational schedules.
  - (3) The program must provide for training other contractor and KSC personnel who have a need for the information involved.
  - (4) The program must provide recertification of personnel in applicable areas.
  - (5) The program must function on a sound economical basis.
- b. As part of the training program evaluation, each training course will be critically reviewed with emphasis placed on the following areas:
- (1) Course Content - reliability of information, currency of information, and scope of information.
  - (2) Training Aids - effectiveness, condition, suitability, reliability, and maintainability.
  - (3) Method of Presentation - impact, suitability, and effectiveness.
  - (4) Instructor - knowledge of subject and effectiveness and skill in presenting material.
  - (5) Student Reaction - suggestions, initiative, acceptance, attendance, and rating.

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13. TRAINING EQUIPMENT/AIDS PROVISIONING AND CONTROL

- a. Training equipment refers to those items such as trainers, simulators, and operational training equipment. In most instances, training equipment will be provisioned at or through the NASA development center and furnished to KSC. Training equipment requirements peculiar to KSC must have program application rather than individual contractor's application. The KSC element requiring the equipment is responsible for actions as defined in the applicable portions of NHB 7500.1.
- b. Each organization providing training is responsible for providing necessary audio-visual equipment, study guides, slides, charts, and similar items as appropriate in support of the training courses. Films, slides, et cetera, available in the film library, should be reviewed for applicability prior to development of new training aids. Requirement for study guides, handbooks, or similar documents is limited to appropriate systems training courses (as opposed to skills or manufacturing training). The Systems Training and Employee Development Branch will assist KSC and other NASA organizations in arranging for training aids. During peak periods when a contractor's equipment may be temporarily inadequate, the Systems Training and Employee Development Branch will assist the contractor in arranging for audio-visual equipment.

14. TRAINING FACILITIES

The organization (KSC/associate contractor) sponsoring training will arrange necessary classroom/facilities from their total space/facility assignment. The Systems Training and Employee Development Branch will provide classroom space for KSC organizations and will assist in providing classroom space to meet peak periods

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of training when contractor facilities are temporarily inadequate.

15. TRAINING CERTIFICATION

- a. Certification, resulting from formal training (Classroom or OJT) and experience, is required prior to performance of certain specified tasks and critical or potentially hazardous operations. Three types of certification will be established. The first two are task certifications; the third is launch crew certification.
- b. Operations/Maintenance Qualification Certification courses are orientated toward a specific piece of equipment or a specific operation. Training courses in the 300 or 400 series which treat activities considered critical in terms of personnel safety, equipment safety, or reliability require certification and periodic recertification of personnel capability to perform the required tasks. Courses which require certification will be identified by including the statement, "This is a certification course," in the body of the course description (Exhibit 1). Certification will apply only to those operations or tasks considered critical by the contractor when the criticality is concurred in by the cognizant KSC organization, or to those operations or tasks considered critical by the cognizant KSC organizations. A student evaluation procedure will be developed for this training to ensure trainee proficiency. A certification card will be awarded by the contractor to each employee qualified to perform the operation or task. The card will reflect the issuing organization, the employee's name, certified operation or task, date and duration of certification, and the instructor's signature. The signature of the supervisor will be added to attest to the individual's demonstration of his qualifications on the job. (See Exhibit 5.)

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- c. Skills training certification (500 series) includes training in basic fabrication and inspection skills and basic safety or operational considerations which may apply to a variety of procedures. Included in the skills certification training will be that training specifically required by NASA/KSC specifications and standards. A certification card (Exhibit 5) will be issued by the contractor to qualified employees where certification is required by NASA/KSC specification.
- d. Launch crew certification is broad certification of general readiness. Each KSC associate contractor organization will develop a plan for identifying personnel who will participate in launch crews or similarly critical operations, and assuring their readiness to participate. The plan will provide for both group and individual needs for experience, OJT and classroom training. These requirements will be documented as a part of the plan, as well as the process for screening and certifying individuals and crews.

16. INTER-CENTER TRAINING

Training resources prepared by the development center during launch vehicle or spacecraft development and testing, as well as other existing resources, will be used to the maximum. KSC will coordinate with the development center the use of existing and planned training activities to determine their applicability in meeting training requirements at KSC.

17. STUDENT HANDBOOKS AND STUDY GUIDES

NASA specifications for operations and maintenance manuals will be used as a guide in the preparation of student handbooks and study guides. Existing formats will be used for the duration of their effectiveness. Major vehicle, spacecraft, or GSE configuration changes will be incorporated into study guides and handbooks subsequent to changes. On publication of operations and maintenance

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manuals covering materials treated in a course, materials which were prepared for instruction purposes only covering the same subject will be discontinued. One copy of each student handbook and study guide will be furnished to the Systems Training and Employee Development Branch.

18. PERSONNEL TRAINING RECORDS

- a. KSC associate contractors will maintain historical records reflecting the training received by their employees. Records for each person participating in a training course will contain the course title, duration in hours, completion date, and a performance rating, where applicable. Organizations will prepare and maintain an attendance record on KSC Form 13-81 (see Exhibit 4) or a similar form for each class conducted. One copy of each attendance record will be forwarded to the Systems Training and Employee Development Branch and to the training coordinator of each participating organization within 10 days of course completion. Files reflecting training activities will be maintained by each contractor for the duration of the program.
- b. The Systems Training and Employee Development Branch will provide a copy of the class attendance record to each participating KSC organization. Records will be maintained on KSC employees as provided in KHB 3410.2.

19. PERSONNEL TRAINING REPORTS

Each contractor will provide KSC with a monthly training report which will be used as basic training evaluation data. The report will reflect activity in all courses conducted or participated in by the contractor. The report will be made on KSC Form 13-101 (see Exhibit 6) or a similar form. It should cover 1 calendar month and be submitted by the tenth workday of the following month. An attached sheet should call attention to special problems and priority requirements.

KSC SYSTEMS TRAINING PROGRAM

COURSE NO: Use numbering system as described in paragraph 6, KHB 3410. 1A.

COURSE TITLE: Title assigned. (Include stage or spacecraft designation, where applicable.)

COURSE LENGTH: Number of hours.

CLASS CAPACITY: Number of participants normally included or recommended.

COURSE DESCRIPTION:

The course description will include a resume of the course. It will include a statement of the course objectives, for whom intended, and any prerequisite course(s), if applicable. Program Element Number (PEN) and/or Contract End Item (CEI) will be identified in 300 and 400 series course treating specific pieces of hardware equipment. Where applicable, the statement "This is a Certification Course" will be included and underlined.

COURSE OUTLINE:

- I. Course data for each course will be prepared on 16-to 20-weight bond paper. In most instances, a single sheet will provide the depth of coverage desired. Both sides of each sheet will normally be used.
  - A. Overall size of sheet will be 8-1/2 by 11 inches.
  - B. The left margin will be 1 inch with a 1/2-inch right margin.
  - C. Both top and bottom margins will be one-half inch.
  - D. Each sheet will be headed by "KSC SYSTEMS TRAINING PROGRAM." The second and succeeding sheets will include the course number and course title in the same order as the first sheet.
  - E. Spacing between identifying elements will be the same as the spacing used in this format.
- II. Major topic headings will be identified by the use of Roman numerals.
  - A. Subheadings will be identified by capital letters. Tertiary headings, if any, will be identified by Arabic numbers.
  - B. The time to be spent on each major topic in the outline will be shown to the left of the subheading under the topic.



SYSTEMS TRAINING REQUIREMENTS FY _____		ORGANIZATION		OPERATIONS MANAGER APPROVAL		DATE
COURSE NUMBER	COURSE TITLE	NUMBER REQUIRING TRAINING				REMARKS
		1 Quarter	2 Quarter	3 Quarter	4 Quarter	





KSC FORM 13-103 (4/66)

**JOHN F. KENNEDY SPACE CENTER, NASA**  
**APOLLO/SATURN**  
**TRAINING/QUALIFICATION CERTIFICATION**

NAME AND SIGNATURE OF HOLDER	
JOB TITLE	
ORGANIZATION	CONTRACT NO.

This is to certify that the holder of this card has completed the courses listed inside. Where indicated by his supervisors initials the employee has met Performance Qualification Requirements.

This certificate is issued as Government property and is valid only at KSC. To be valid each certification must be signed by holders present supervisor. Recertifications must be initiated in the date block. This certificate must be surrendered to the employing organization when job assignment is changed, certification is revoked or holder changes employment.

Fold

1. COURSE TITLE			
SUPERVISOR'S SIGNATURE			DATE
INSTRUCTOR'S SIGNATURE			DATE
CATEGORY	PERFORMANCE QUAL	RECERT. DATE	RECERT. DATE
2. COURSE TITLE			
SUPERVISOR'S SIGNATURE			DATE
INSTRUCTOR'S SIGNATURE			DATE
CATEGORY	PERFORMANCE QUAL	RECERT. DATE	RECERT. DATE
3. COURSE TITLE			
SUPERVISOR'S SIGNATURE			DATE
INSTRUCTOR'S SIGNATURE			DATE
CATEGORY	PERFORMANCE QUAL	RECERT. DATE	RECERT. DATE
4. COURSE TITLE			
SUPERVISOR'S SIGNATURE			DATE
INSTRUCTOR'S SIGNATURE			DATE
CATEGORY	PERFORMANCE QUAL	RECERT. DATE	RECERT. DATE

Exhibit 5 - Certification Card

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Appendix A[illegible]